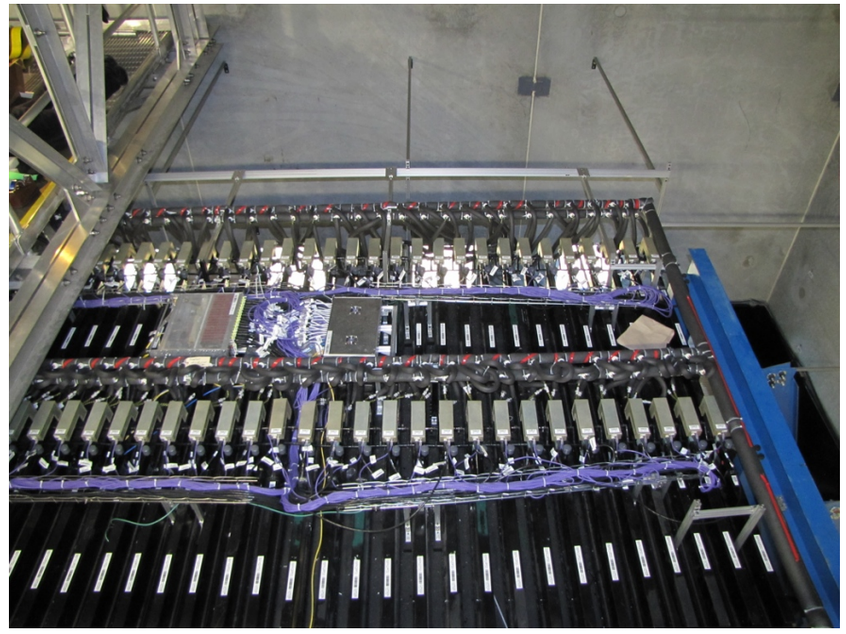
Status of NOvA NDOS



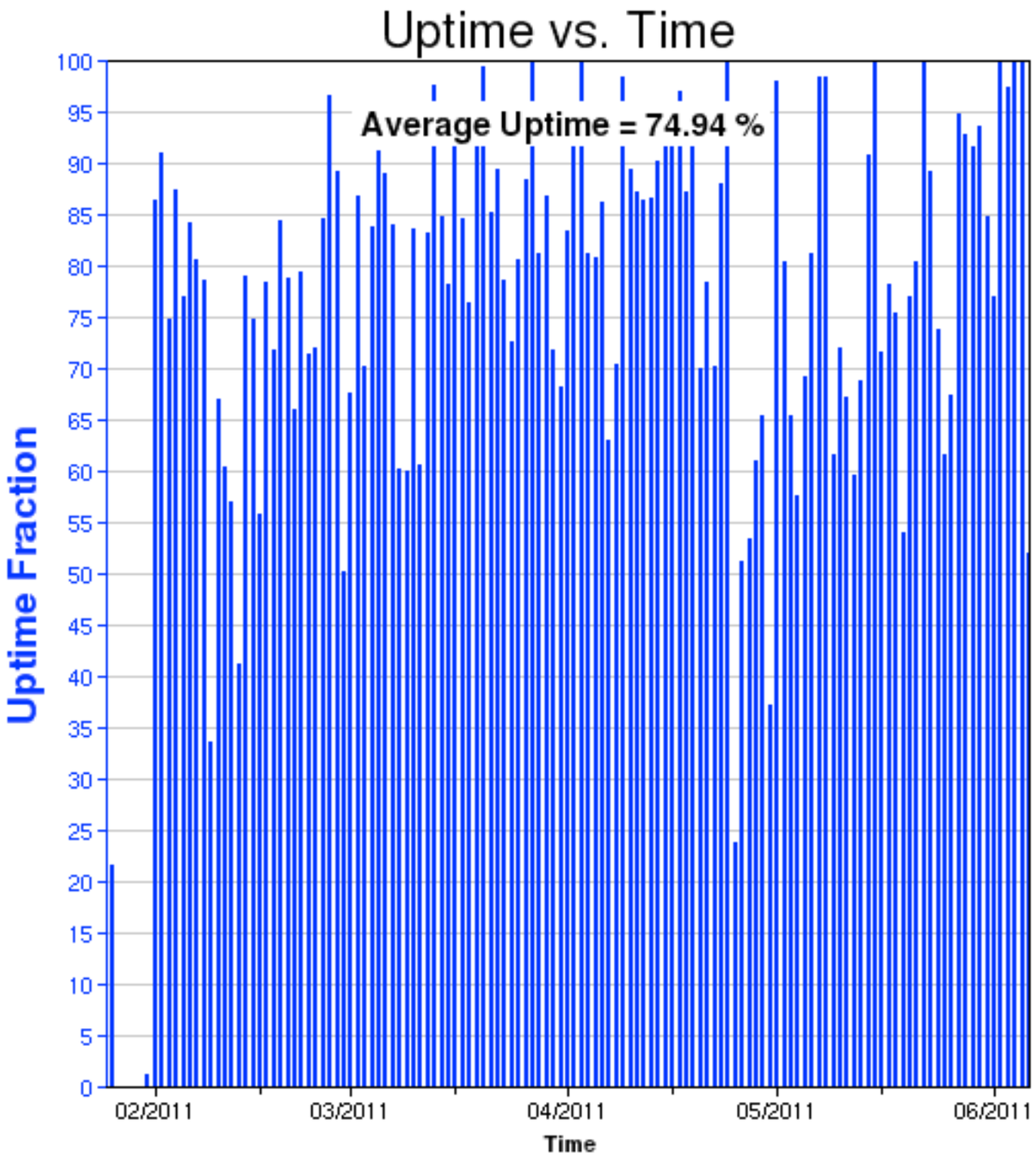
Jonathan Paley
Argonne National Laboratory

Run Coordinator Report
June 6, 2011

What's New?

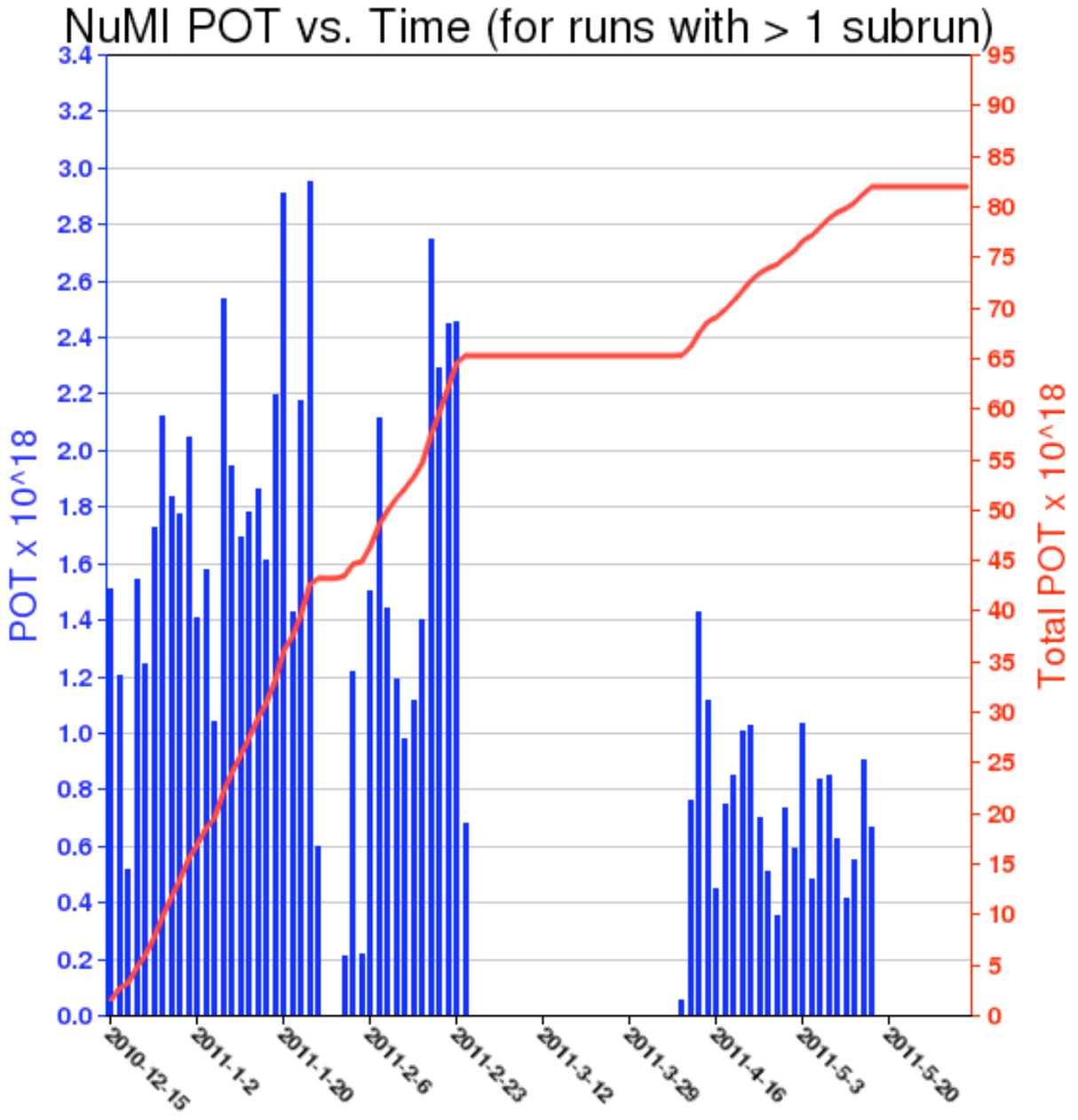
- DAQ is very stable
- All blocks are now installed and filled with scintillator (including Muon Catcher)
- We have enough electronics to fully instrument the four most upstream blocks (IPND), which is our fiducial volume.
- APD cooling tests underway; goal is to run with many cooled APDs by the end of this week
- Physics:
  - Observation of BNB events
  - Offline calibration and analysis making good progress.

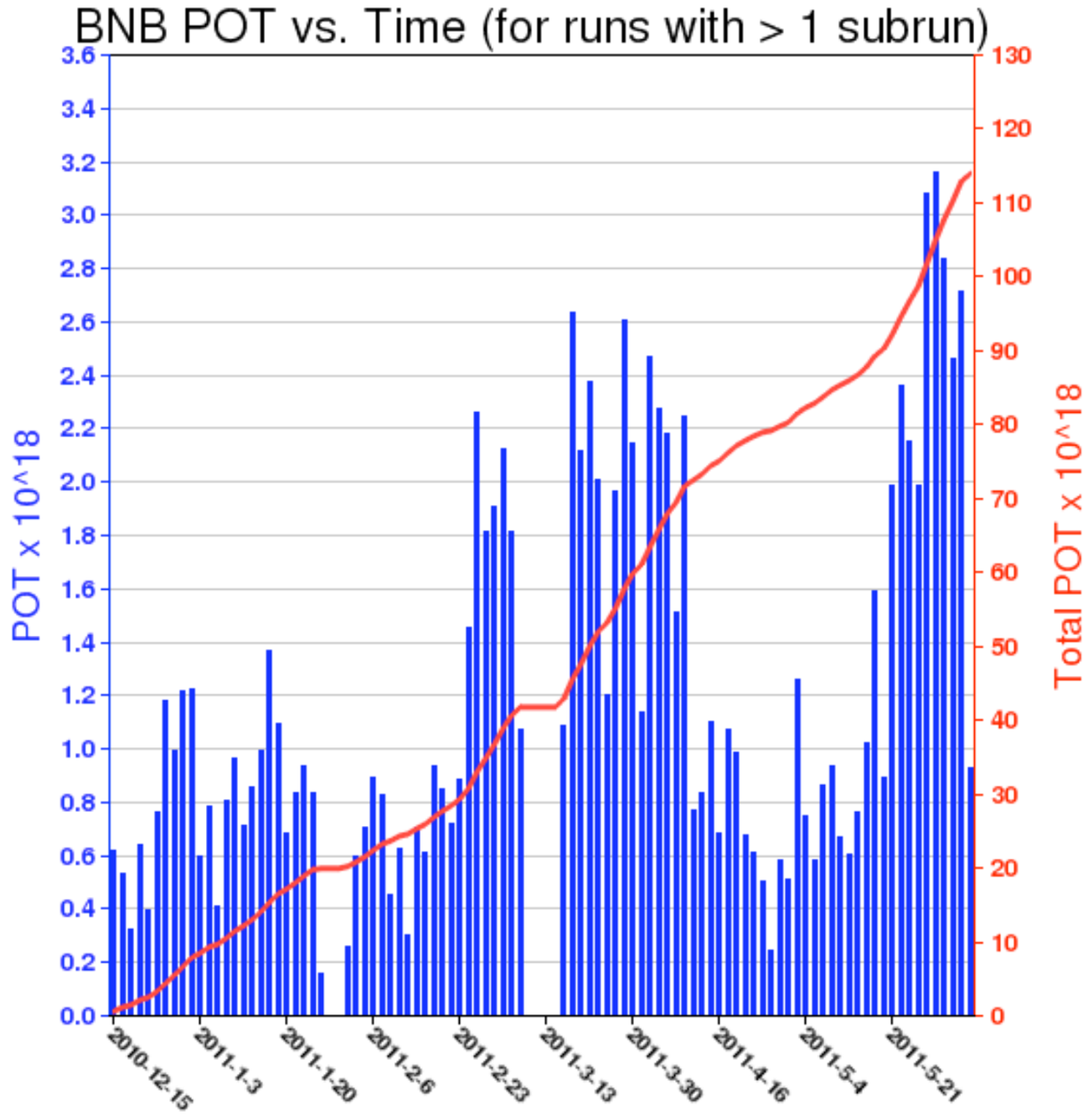
Detector Uptime



- Plot on the left includes downtime due to commissioning work.
- Analysis of downtime due to DAQ failures between the hours of **8 pm and 8 am** shows:
  - previous week: 95% uptime
  - previous month: 89% uptime

Neutrino Beam Exposure





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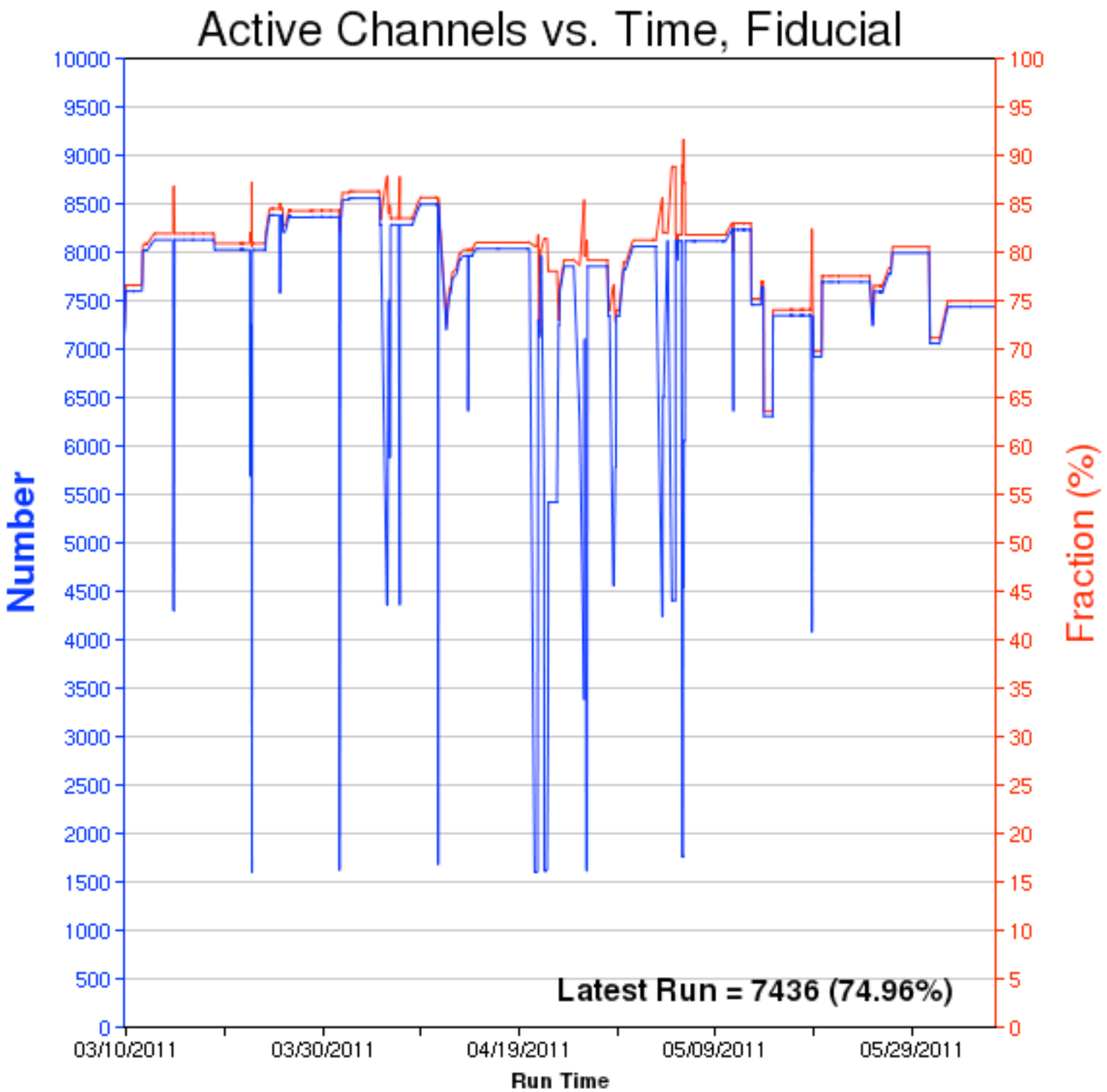
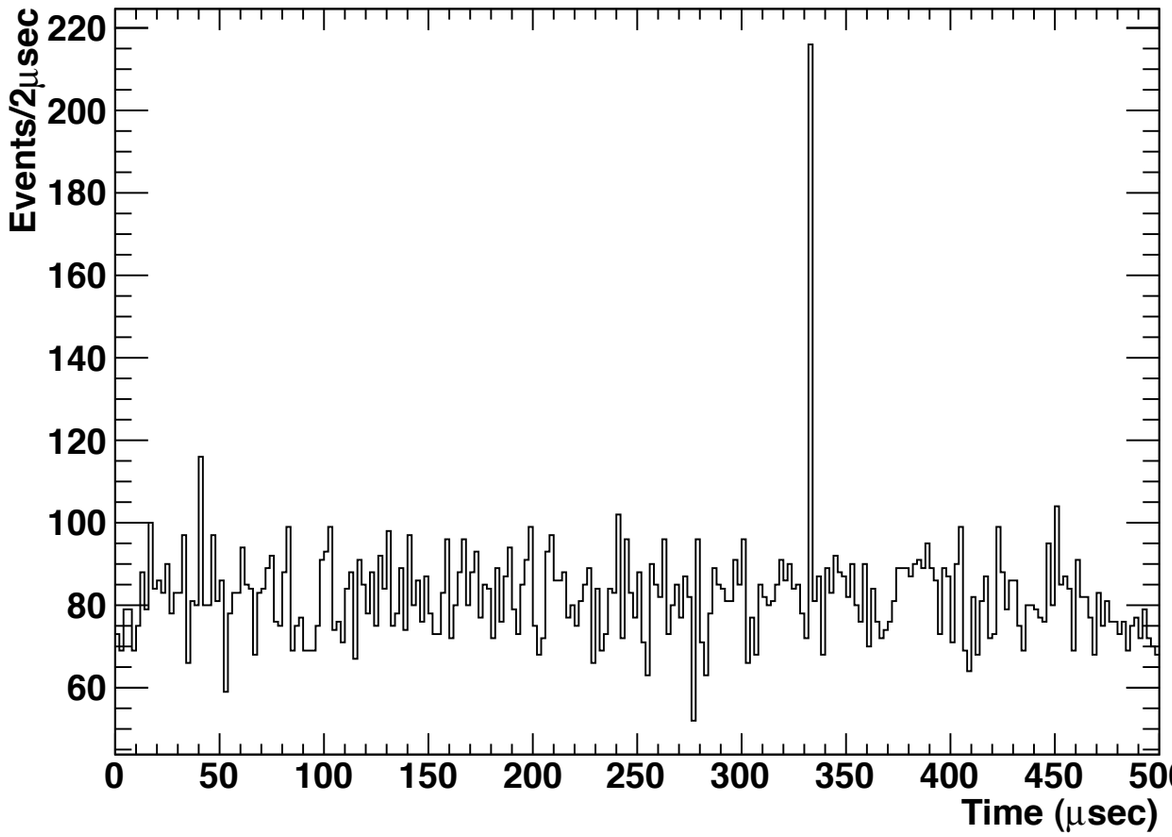
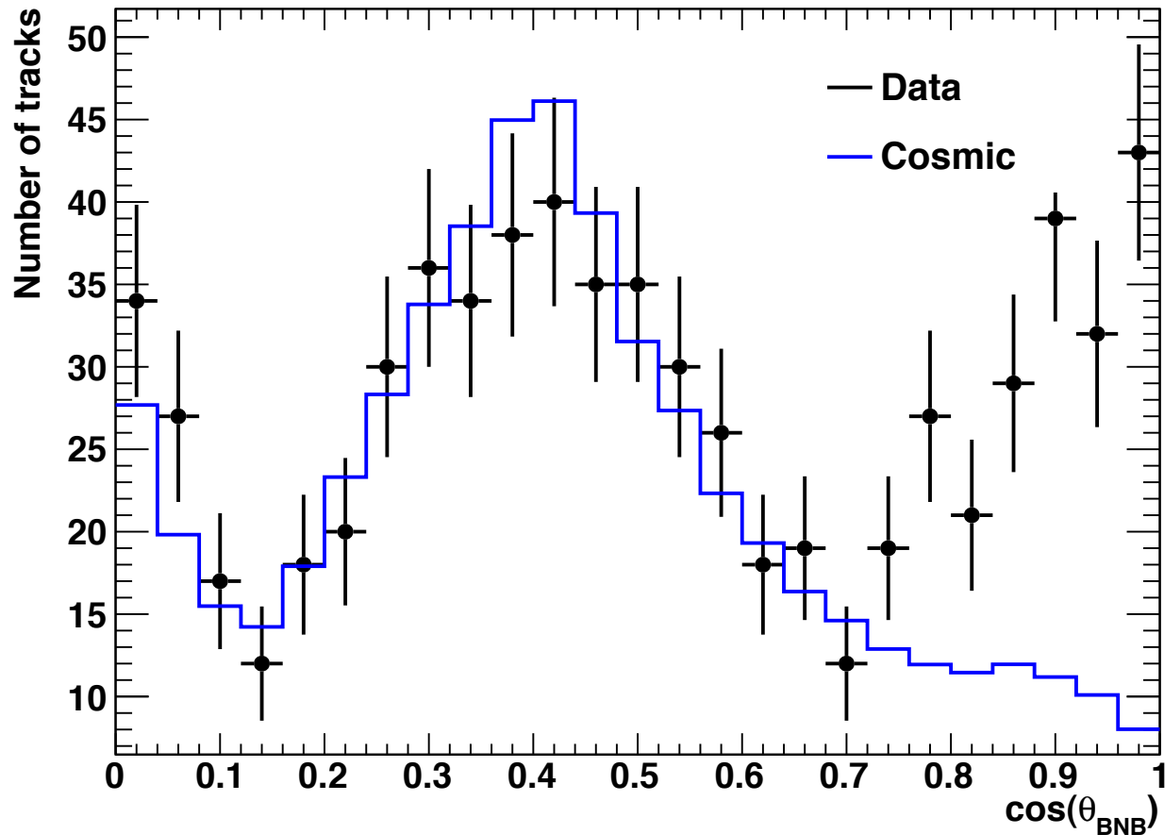
Active Channel Counts



- ~10% drop in active channel count in the fiducial volume over the past 2 months
- Due to APD cooling tests and unexpected sensitivity of electronics to humidity.
- Investigations so far have discovered misaligned and faulty o-rings in APD housing. We hope to be able to recover these lost channels. Further investigations this week.

BNB Events in the NDOS





- BNB events are clearly observed in the NDOS
- Analysis cuts modified to search for BNB events (NDOS is nearly on Booster axis, but detector is rotated wrt beam axis)
- In the above plots: 3 x 10^{19} POT, 222 BNB events, 92 cosmic BG

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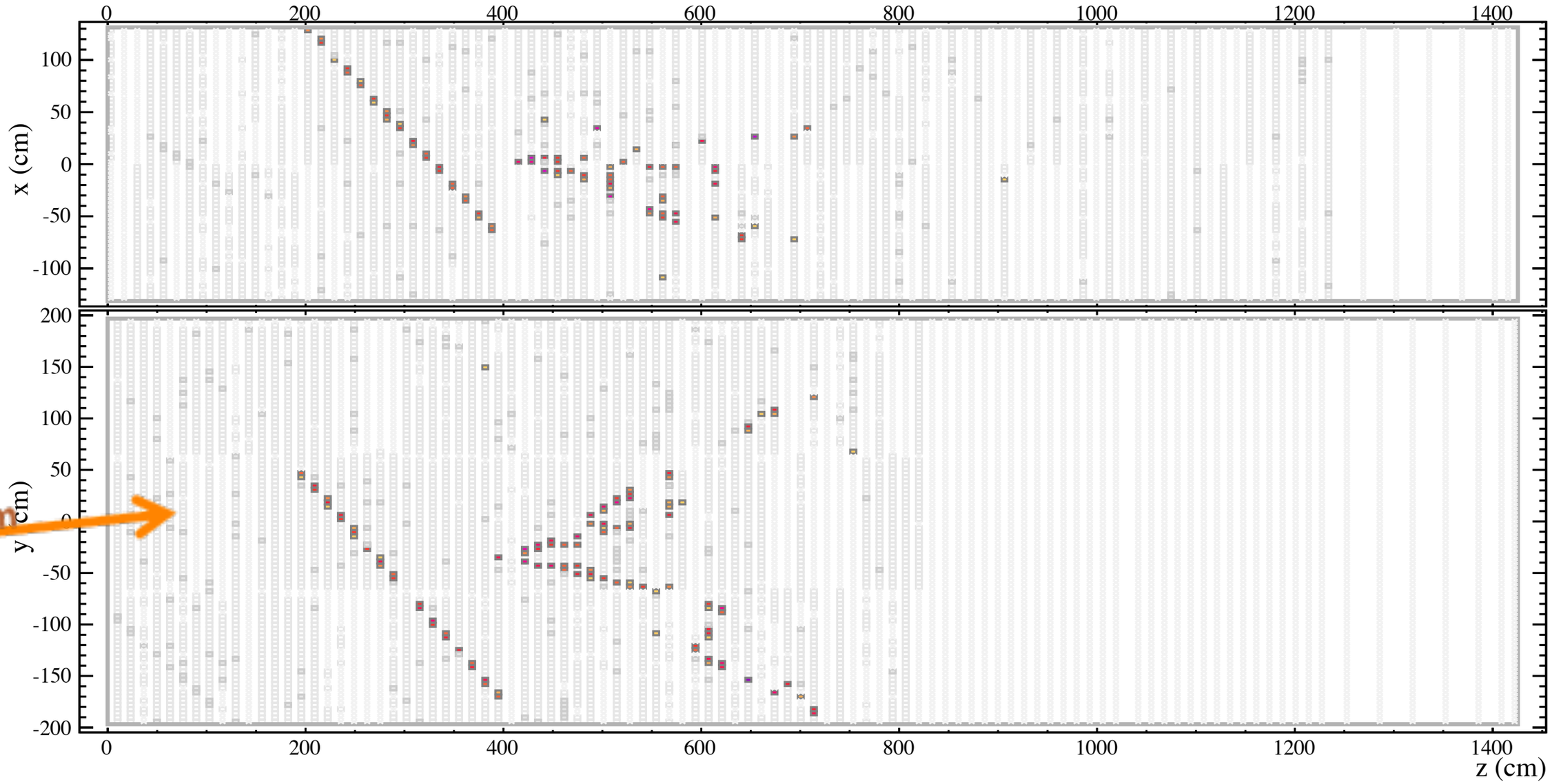
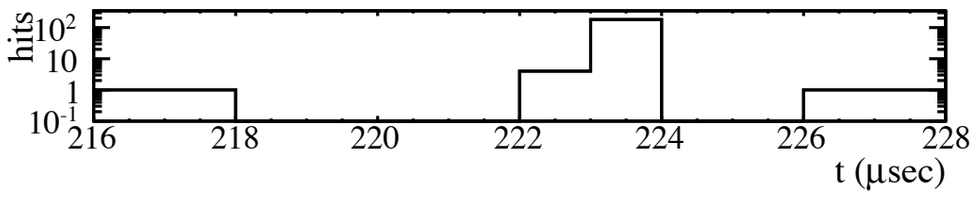
BNB Events in the NDOS

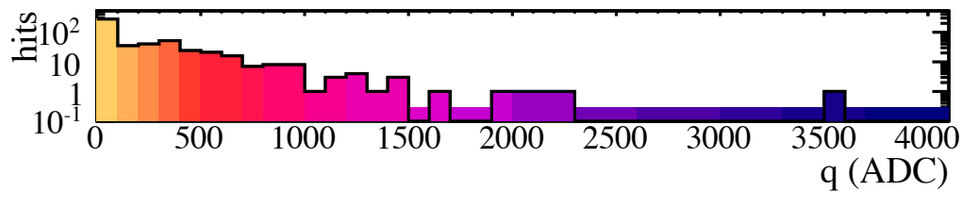


NOvA - FNAL E929

Run: 11956/6
Event: 273516

UTC Mon Apr 11, 2011
00:35:22.853571392





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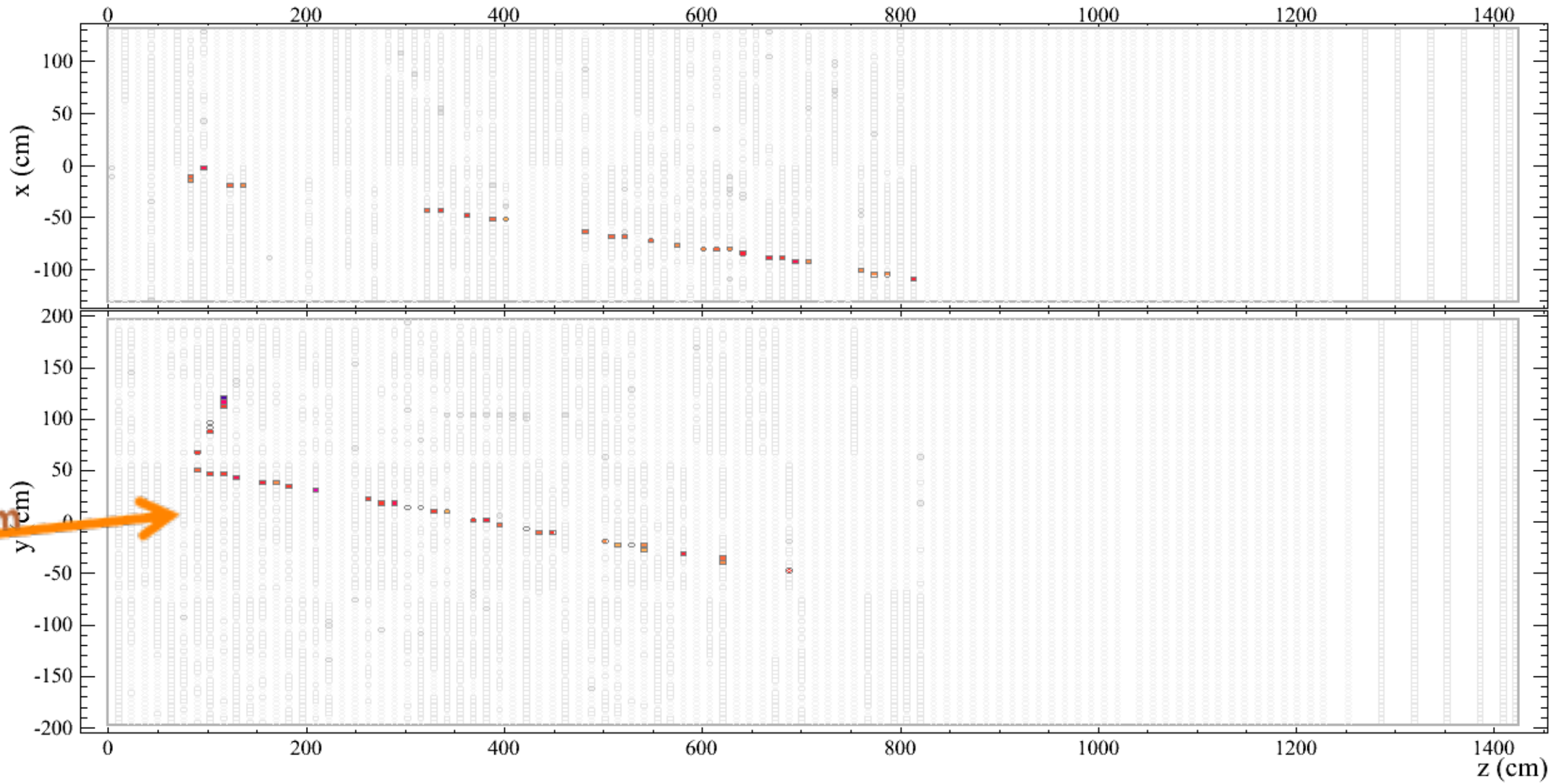
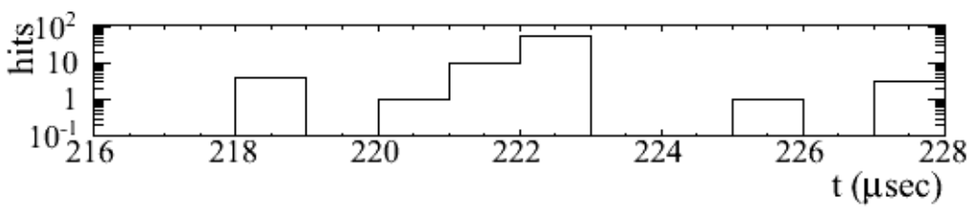
BNB Events in the NDOS

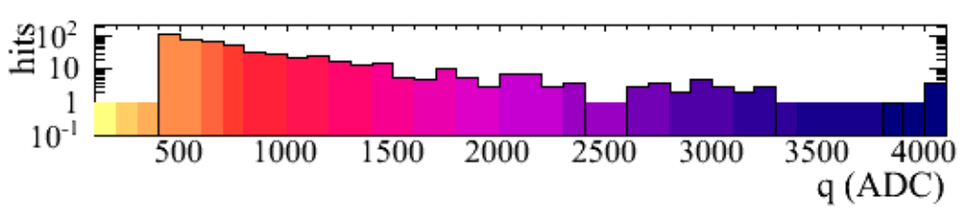


NOvA - FNAL E929

Run: 10893/8
Event: 314724

UTC Tue Dec 21, 2010
11:48:18.997623872





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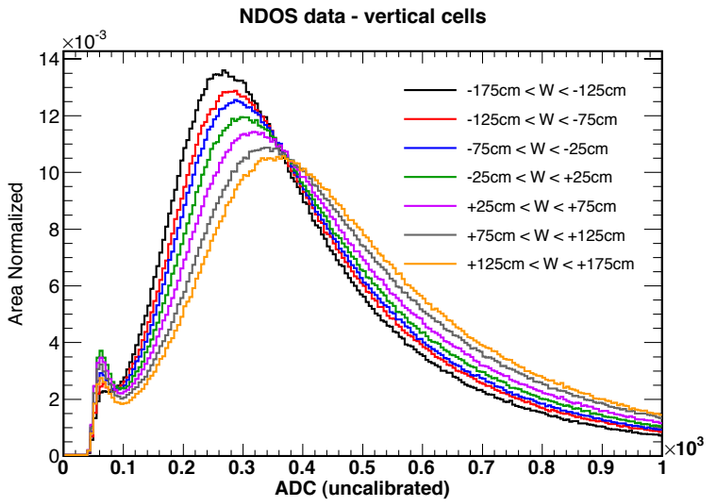
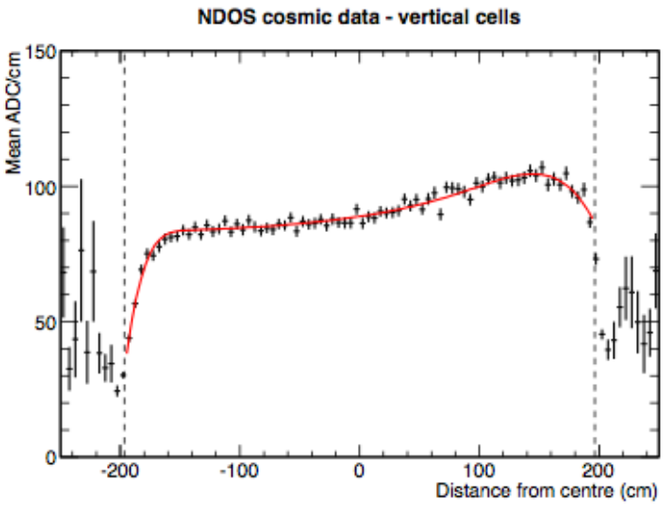
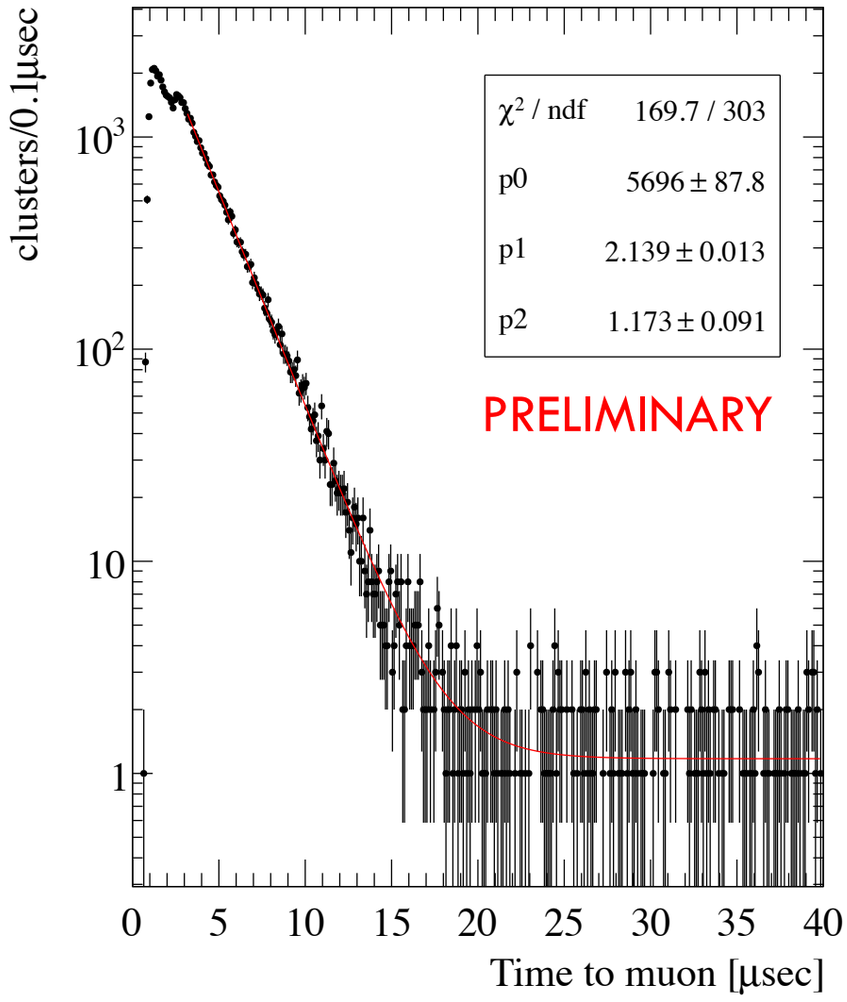
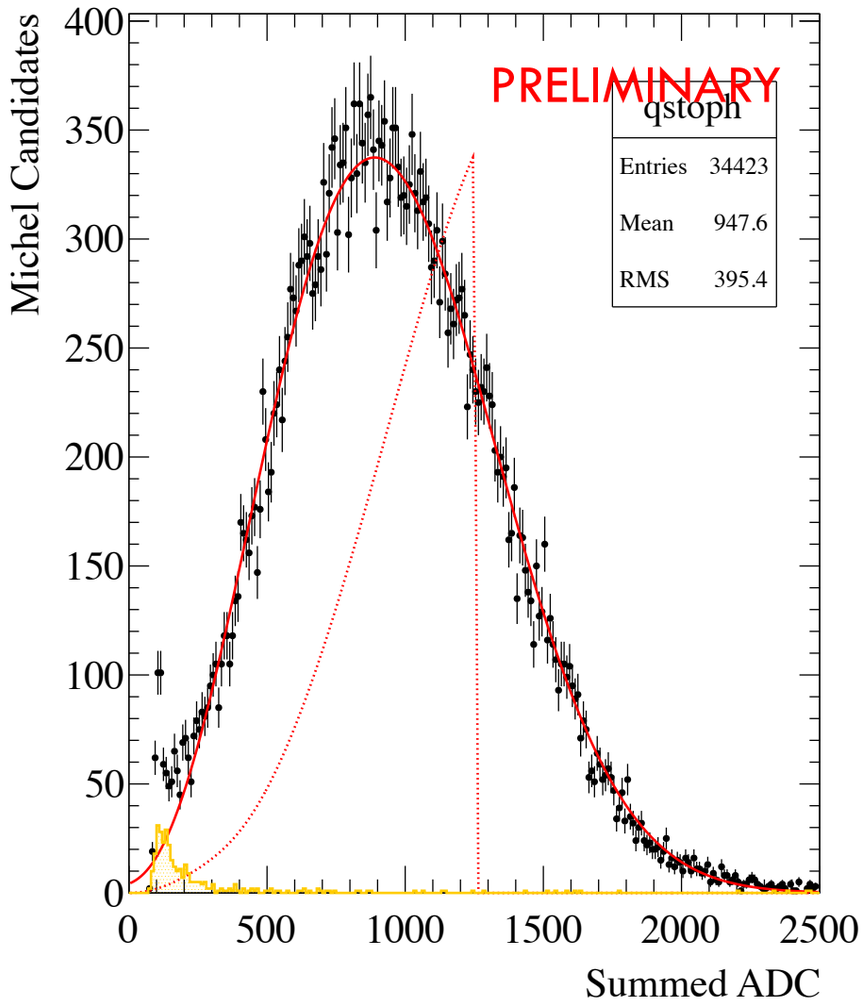
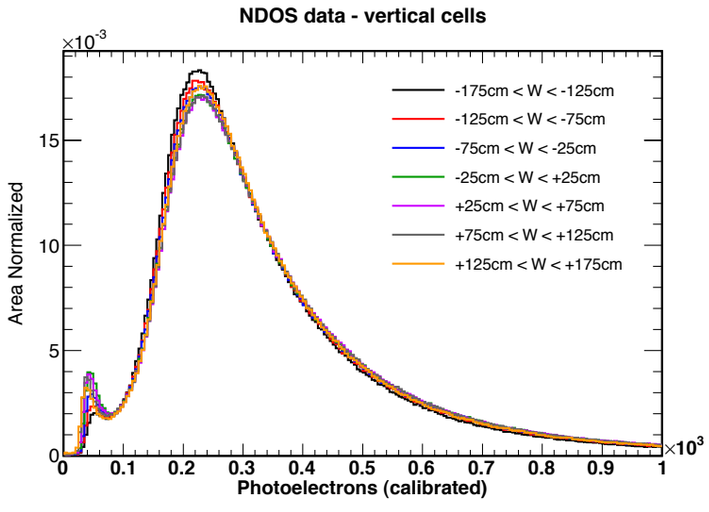
Calibration Using Cosmic Ray Data











- Track reconstruction enables use to use muons for calibration:
  - attenuation corrections
  - Michel electrons for absolute EM energy calibration

Summary

- Detector construction complete
- Excellent progress in DAQ stability, lots learned from recent DAQ stress tests (tcp input buffer depth was not being dynamically set to large enough values).
- APD cooling tests underway; progress in Detector Controls System will allow us to begin running with cooled APDs in ~1 week
- Operation of NDOS and analysis of data have proven critical for understanding how we go from NDOS to 14 kT FD
- Tasks on the horizon:
  - Get fiducial volume to ~100% active channels
  - Implement and exercise DAQ partitioning